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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/627,165

07/24/2003

Thomas Laursen

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EXAMINER

SMITH, NICHOLAS A

ART UNIT

PAPER NUMBER

1753

MAIL DATE

DELIVERY MODE

08/09/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

**Office Action Summary**

Application No.

10/627,165

Applicant(s)

LAURSEN ET AL.

Examiner

Nicholas A. Smith

Art Unit

1753

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 30 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 3-21 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-21 is/are rejected.
- 7) ☒ Claim(s) 12 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 30 May 2007 has been entered.

### ***Claim Objections***

2. Claims 4 and 12 are duplicate claims.

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1, 3, 6-11, 13, 14, and 16-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Hsu et al. (US 2003/0040188).

5. In regards to claims 1 and 17, Hsu et al. discloses a method of planarizing a semiconductor surface comprising a field region and a plurality of features (Fig .8B-D, paragraphs [0139]-[0141]), forming a barrier layer overlying at least the field region (col.

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1, lines 43-48), electrodepositing a layer comprising copper having a substantially planar upper surface overlying the barrier layer and filling the features in the insulating layer (paragraphs [0114], claims 1 and 5, and Fig. 8C, the second deposition step in the Hsu et al. disclosure), and polishing the layer comprising copper and the barrier layer to remove the layer comprising copper and the barrier layer from the field region using a standard chemical mechanical polishing technique (CMP) (Fig. 8D, paragraph [0141]). Hsu et al. discloses the use of a single soft polishing pad in electrochemical mechanical polishing or chemical mechanical polishing process (paragraph [0064] and [0077]).

6. In regards to claim 3, while Hsu et al. does not specifically disclose the claimed range on the hardness scale for a soft polishing pad, since Hsu et al. discloses the same supplier and trade name as defined in the instant specification (paragraph [0023]), the same products (pads) would have the substantially the same properties.

7. In regards to claim(s) 6-10 and 18, Hsu et al. discloses cleaning and buffing on a single platen or on separate platens, low-k dielectric material and polishing thereof, and modularity of platens in steps of planarizing process (paragraphs [0117], [0130] and [0142]).

8. In regards to claim(s) 11, Hsu et al. discloses depositing a seed layer (claim 7). Furthermore, Hsu et al. discloses the claimed deposited thickness (claim 6). Applicant is reminded that claim language for the electrodepositing step is in comprising format.

9. In regards to claim(s) 13, Hsu et al. discloses the claimed method as stated above in paragraph 5. Furthermore, Hsu et al. discloses depositing a seed layer (claim 7).

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10. In regards to claim(s) 14, Hsu et al. discloses electrochemical mechanical polishing (paragraph [0077]).
11. In regards to claim(s) 16, Hsu et al. discloses the chemical mechanical polishing process on a single platen (paragraph [0064]).
12. In regards to claim 19, Hsu et al. discloses robotically moving a workpiece to a second platen of the multi-platen apparatus (paragraph [0054]).
13. In regards to claim 20, Hsu et al. teaches alignment of workpiece with respective first and second platens with a robot (paragraph [0054]).

***Claim Rejections - 35 USC § 103***

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. Claims 4-5, 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al., and in view of Mahulikar et al. (US Patent 6,776,696).
16. In regards to claims 4 and 12, Hsu et al. do not disclose a process wherein there is a presence of a polishing slurry has a copper:barrier layer selectivity of substantially 1:1.
17. Mahulikar et al. teaches a process wherein there is a presence of a polishing slurry has a copper:barrier layer selectivity of substantially 1:1 (col. 2, lines 49-51). It would have been obvious to one of ordinary skill in the art to apply Mahulikar et al.'s

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slurry to Hsu et al.'s process in order to get the best topography (Mahulikar et al., col. 2, lines 49-51).

18. In regards to claims 5 and 15, Hsu et al. do not disclose a process wherein there is a presence of a polishing slurry has a copper:barrier layer selectivity of substantially greater than 1:1.

19. Mahulikar et al. teaches the use of two separate slurries on a single platen with the claimed slurry selectivities (col. 2, lines 49-51, col. 3, line 40 to col. 4, line 5, col. 5, lines 38-45). It would have been obvious to one of ordinary skill in the art to apply Mahulikar et al.'s two slurries to Hsu et al.'s process in order to save processing time (Mahulikar et al., col. 5, lines 14-18).

20. Claim 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hsu et al.

21. In regards to claim 21, Hsu et al. are applied to the claim for the same reasons as stated above. Furthermore, Hsu et al. teaches a pressure applied range that substantially overlaps the claimed pressure range and therefore a prima facie case of obviousness is established. See MPEP 2144.05. It would have been obvious to one of ordinary skill in the art to select the claimed pressure range from the broader prior art range because prior art teaches the same utility over the entire range.

### ***Response to Arguments***

22. Applicant's arguments and amendments, see instant claims and remarks, filed 30 May 2007, with respect to the rejection(s) of claim(s) 1-21 under Ueno (US 6,245,676) in view of Saka et al. (US 6,476, 921) have been fully considered and are persuasive.

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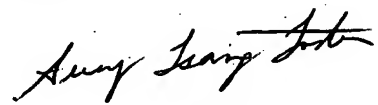
Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Hsu et al. (US 2003/0040188) as stated above.

**Conclusion**

23. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nicholas A. Smith whose telephone number is (571)-272-8760. The examiner can normally be reached on 8:30 AM to 5:00 PM, Monday through Friday.

24. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Susy Tsang-Foster can be reached on (571)-272-1293. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

25. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

  
SUSYTSANG-FOSTER  
PRIMARY EXAMINER